

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1, 2, and 4-15 are presently pending in this case. Claims 1 and 9 are amended and new Claims 14 and 15 are added by the present amendment. As amended Claims 1 and 9 and new Claims 14 and 15 are supported by the original disclosure,¹ no new matter is added.

In the outstanding Official Action, Claims 1, 2, and 4-13 were rejected under 35 U.S.C. §103(a) as unpatentable over Mastrangelo (U.S. Patent No. 3,196,091) in view of TW 453,508 (hereinafter “TW ‘508”).

The outstanding rejection is respectfully traversed.

Fluoride electrolysis involves a relatively large amount of reaction heat. If a temperature of an electrolytic bath is excessively increased due to reaction heat, the following disadvantages may be observed, for example: the electrolytic bath boils and scatters, the corrosion of the electrolytic bath or an electrode is precipitated on account of increased reactivity of the electrolytic bath, and the electrolysis efficiency is decreased on account of excessive migration of ions constituting the electrolytic bath. In this regard, amended Claim 1 recites in part a thermometer which measures temperature of the electrolytic bath, and the first heat exchanging means includes: a pipe through which a heat exchange medium flows; and a heating-cooling apparatus which heats and cools the heat exchange medium based on temperature information of the electrolytic bath supplied from the thermometer. Thus, the invention recited in amended Claim 1 is capable of achieving a prominent effect that the aforesaid disadvantages are forestalled in such a way that a heat exchange medium heats and cools the electrolytic bath in the electrolytic cell so that fluoride electrolysis is always conducted in an optimum temperature state (of the electrolytic bath).

¹See, e.g., the publication of the specification at paragraphs 46, 47, 50 and 58.

In contrast, the apparatuses described by Mastrangelo and TW '508 do not include a thermometer, a pipe, and a heating-cooling apparatus as defined in amended Claim 1.

Mastrangelo describes a cooling coil 20 and a heating jacket 18, which the outstanding Office Action cited as “first heat exchanging means” as recited in Claim 1 and “second heat exchanging means” as recited in Claim 2, respectively.² The heating jacket 18 provided around the electrolytic bath, however, is merely provided as a heater, and hence it cannot perform cooling. On the other hand, the cooling coil 20 can perform only cooling and not heating. Furthermore, since the cooling coil 20 is provided around a gas phase part of the electrolytic cell, it cannot cool the electrolytic bath. For these reasons the heating jacket 18 and the cooling coil 20 disclosed in Mastrangelo are different from the first heat exchange means recited in Claim 1 and the second heat exchange means recited in Claim 2. In addition, the apparatus of Mastrangelo cannot exert the aforesaid effects of the electrolytic apparatus of the claimed invention, because it is not provided with the thermometer, pipe, and heating-cooling apparatus further defined in Claim 1.

TW '508 illustrates a heating coil 123 in Figure 2. The heating coil 123, being similar to the heating jacket 18 of Mastrangelo, cannot perform cooling and hence it is different from the claimed first heat exchange means. Therefore this component disclosed in TW '508 is also different from the first and second heat exchange means of the claimed invention.

Assuming *arguendo* that the outstanding Office Action correctly asserts that TW '508 illustrates “a protective sheath,” it is respectfully submitted that the purpose of this component is to mount a semiconductor wafer or substrate thereon, and hence this “protective sheath” is different from the outer frame and heat insulating zone disposed outside of the electrolytic cell. TW '508 cannot therefore exert the effects obtained when an electrolytic apparatus is provided with a heat insulating zone, such as improvement in the response of

²See the outstanding Office Action at page 3, lines 18-20.

temperature control to an input (instruction of heating or cooling) from the temperature control apparatus and the prevention of burn injuries when an operator touches the electrolytic cell.

Therefore, it is respectfully submitted that the proposed combination of Mastrangelo and TW '508 does not teach or suggest "first heat exchanging means," "an outer frame," and "a thermometer" as defined in amended Claim 1. Consequently, amended Claim 1 (and Claims 2, 4-8, 12, 13, and 15 dependent therefrom) is patentable over Mastrangelo in view of TW '508.

Amended Claim 9 recites similar elements to amended Claim 1 without invoking 35 U.S.C. §112, sixth paragraph. As the proposed combination of Mastrangelo and TW '508 does not teach or suggest "a jacket," "an outer frame," and "a thermometer" as defined in amended Claim 9, amended Claim 9 (and Claims 10, 11, and 14 dependent therefrom) is also patentable over Mastrangelo in view of TW '508.

New Claims 14 and 15 are supported at least by the specification at page 18, line 2 to page 22, line 19 and Figures 13 and 15. New Claims 14 and 15 are dependent on Claims 1 and 11, and thus are believed to be patentable for at least the reasons described above with respect to these claims. In addition, Claims 14 and 15 recite subject matter that further patentably defines over Mastrangelo in view of TW '508. In particular, in a case where an electrolytic cell is electrically connected with a heating-cooling apparatus, disadvantages such as breakdown of the heating-cooling apparatus may occur. In this regard, the invention recited in Claims 14 and 15 makes it possible to prevent disadvantages such as electricity leakage due to electric short-circuit, electrification through the heat medium or tube, and corrosion of the electrolytic cell, because the electrolytic cell body used as a cathode is electrically insulated from the heating-cooling apparatus and hence electric short-circuit is

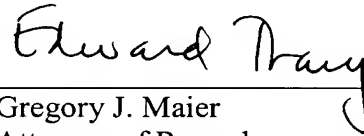
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prevented. Consequently, new Claims 14 and 15 are further patentable over Mastrangelo in view of TW '508.

Accordingly, the pending claims are believed to be in condition for formal allowance.
An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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A handwritten signature in cursive script, appearing to read "Edward Tracy", is written over a horizontal line.

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